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1972 study

ANACONDA, MONTANA TRAFFIC CONTROL DEVICE STUDY



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ANACONDA, MONTANA

TRAFFIC CONTROL DEVICE STUDY

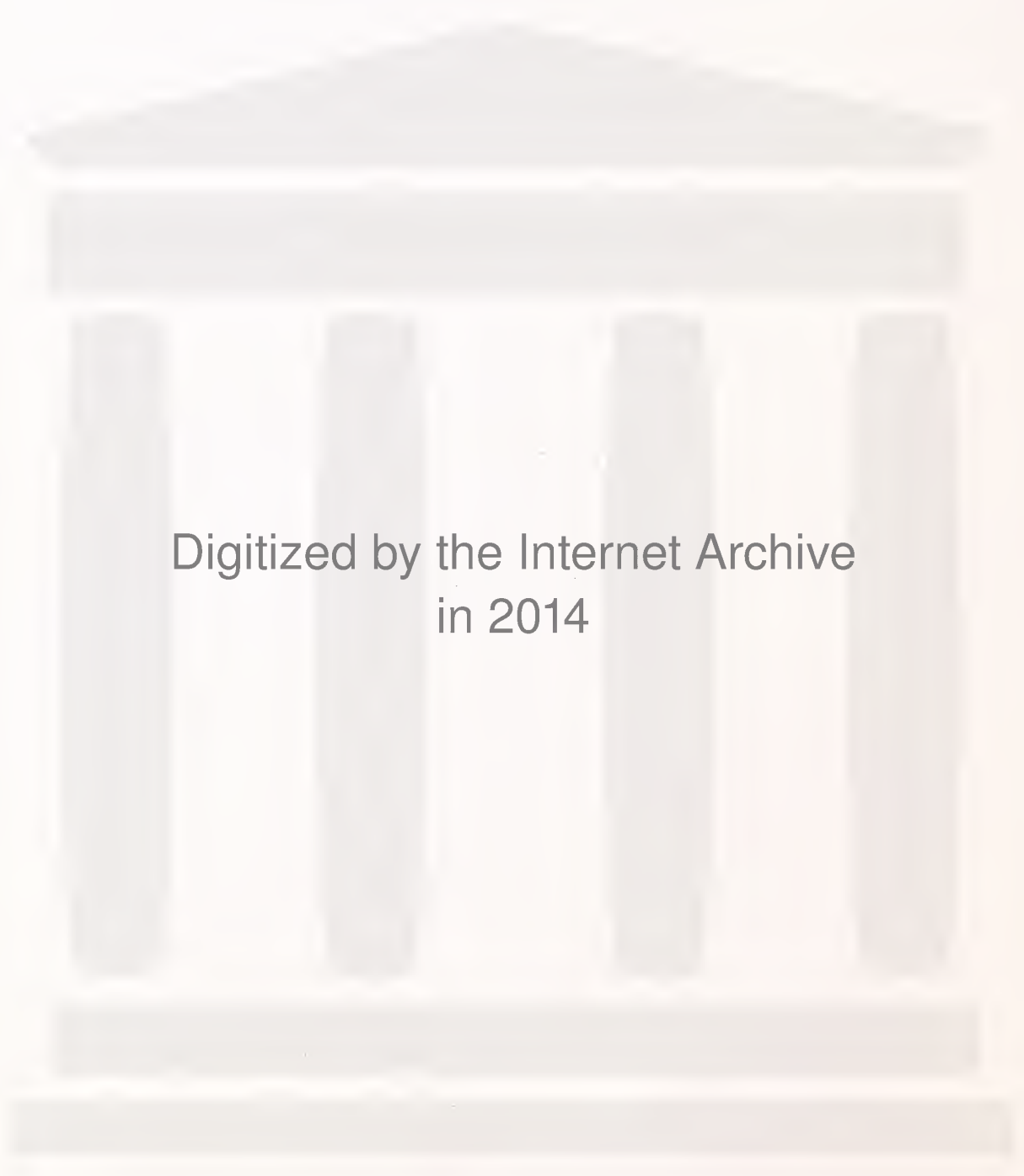
PREPARED FOR:

THE CITY OF ANACONDA

BY:

CLETE DAILY AND ASSOCIATES

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CLETE DAILY AND ASSOCIATES

TRAFFIC ★ TRANSPORTATION ★ PARKING
CITY AND REGIONAL PLANNING

July 25, 1972

Honorable Mayor and City Council

City of Anaconda

Anaconda City Hall

Anaconda, Montana

Gentlemen:

In accord with the agreement executed between the City of Anaconda and Clete Daily and Associates, we are pleased to submit herewith, the Anaconda Traffic Control Device Study.

This report includes the inventory and evaluation of traffic control devices in the City of Anaconda and the tabulation and evaluation of traffic accidents at the five highest accident locations in the City.

We received excellent cooperation from the City Police Department, City Clerk and other City staff members.

Respectfully submitted,

CLETE DAILY AND ASSOCIATES

Clete Daily, P.E.

Mayor and City Council

Mayor

Paul Beausoleil

First Ward

Mario Ungaretti

Thomas Newell

Second Ward

Tony Joy

Lawrence Thomas

Third Ward

John Barclay

Francis E. Sullivan

Fourth Ward

Harold Hammond

Carl Anderson

Fifth Ward

Matt Beatty

Thomas McNellis

Sixth Ward

Owen McNally

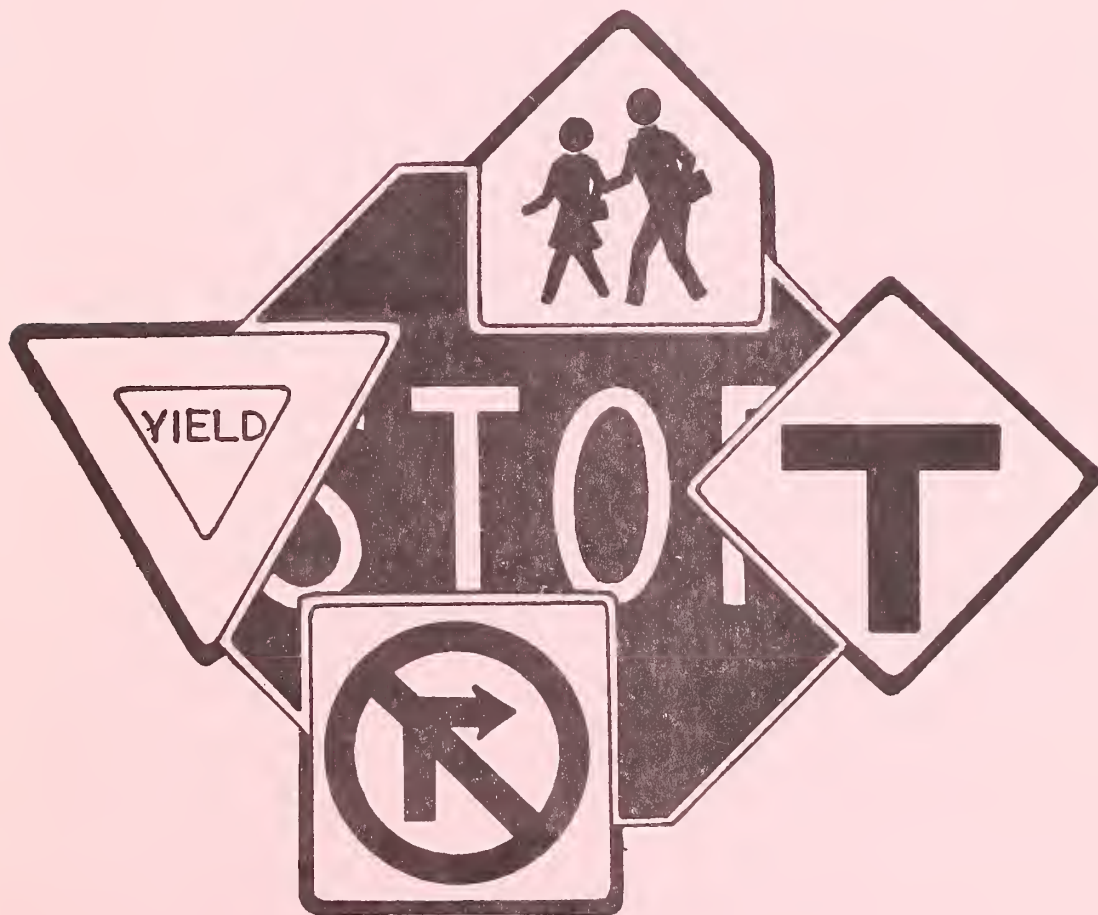
Peter M. Agostinelli

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CHAPTER 1

INTRODUCTION



CHAPTER I

INTRODUCTION

SCOPE

The scope of this study can be summarized into five distinct elements:

1. Field inventory of all signs and signals in the City of Anaconda to determine the location and physical condition of each device.
2. Evaluation of each control device to determine deficiencies based upon National Standards.
3. Tabulation of accident records for the past three years to determine the five highest accident locations in the City of Anaconda.
4. Analysis of detailed accident diagrams at the five highest accident locations in the City of Anaconda to determine if there is a discernible deficiency in the intersection design that may be contributing to the accident rate.
5. Recommendations for upgrading the traffic control device system and for improving safety at high accident locations.

TYPE OF SIGNS

The three functional types of signs used to control traffic are:

1. Regulatory Signs
2. Warning Signs
3. Guide Signs

Regulatory signs provide information pertaining to traffic laws and regulations. This type of sign can be classified into one of six groups which designate a message intended for a particular kind of use.

1. Right-of-Way Series - STOP and YIELD signs.
2. Speed Series - designate speed zones and limits.
3. Movement Series - designate allowable or prohibited turning movements; for example - NO LEFT TURN or ONE WAY.
4. Parking Series - govern the stopping and standing of vehicles. Examples are NO PARKING and 2 HOUR PARKING.
5. Pedestrian Series - regulate the movement of pedestrians. Examples are WALK ON LEFT FACING TRAFFIC and PUSH BUTTON FOR GREEN LIGHT.
6. Miscellaneous Series - regulate special condition traffic such as: ROAD CLOSED, LOCAL TRAFFIC ONLY or WEIGHT LIMIT - 10 TONS.

Warning signs are used to warn traffic of existing or potentially hazardous conditions on or adjacent to a highway or street.

Warning signs can be divided into the following twelve groups:

1. Changes in horizontal alignment - includes curve signs and winding road signs.
2. Intersections - designates configuration of intersections such as a "T" intersection or a side road entering a main road.
3. Advance warning of control devices - this group includes SIGNAL AHEAD, STOP AHEAD and YIELD AHEAD signs.
4. Converging traffic lanes - gives advance notice of a reduction in the number of traffic lanes. An example is the MERGING TRAFFIC sign.
5. Narrow roadways - warns of reduction of roadway width. Typical signs in this group are: ROAD NARROWS, NARROW BRIDGE and ONE LANE BRIDGE.
6. Changes in highway design - two signs make up this group, the DIVIDED HIGHWAY and DIVIDED HIGHWAY ENDS signs.
7. Grades - the HILL sign is the only sign in this group.
8. Roadway surface conditions - warns of changes in the surface and profile of the road. Typical signs in this group are: BUMP, DIP and SLIPPERY WHEN WET.
9. Schools - used in locations where schools are adjacent to the highway or street. Signs in this group are: SCHOOL and SCHOOL CROSSING.
10. Railroad crossings - two signs comprise the category, the railroad advance warning sign and the railroad crossbuck sign.

11. Entrances and crossings - warn of hazardous conditions, may or may not be of a temporary or seasonal nature. An example of this type is the TRUCK CROSSING sign.
12. Miscellaneous - this category is comprised of signs not elsewhere classified. An example is the LOW CLEARANCE sign.

Guide signs are used to guide the motorist along established routes and to direct him to cities, towns, nearby rivers, parks and other points of interest.

Guide signs are classified in three major groups:

1. Route markers - designate established routes by number. Examples of this type of sign are the U.S. 10-A markers located on Park Avenue.
2. Destination and distance signs - designate specific street or town names and distances. Included in this group are street name signs and signs such as EXIT and THRU TRAFFIC.
3. Information signs - designate areas of interest to the traveler though not necessary for guidance. This category includes such signs as ROADSIDE REST - 1000 FEET, PARKING and other general information signs.

TRAFFIC SIGNALS

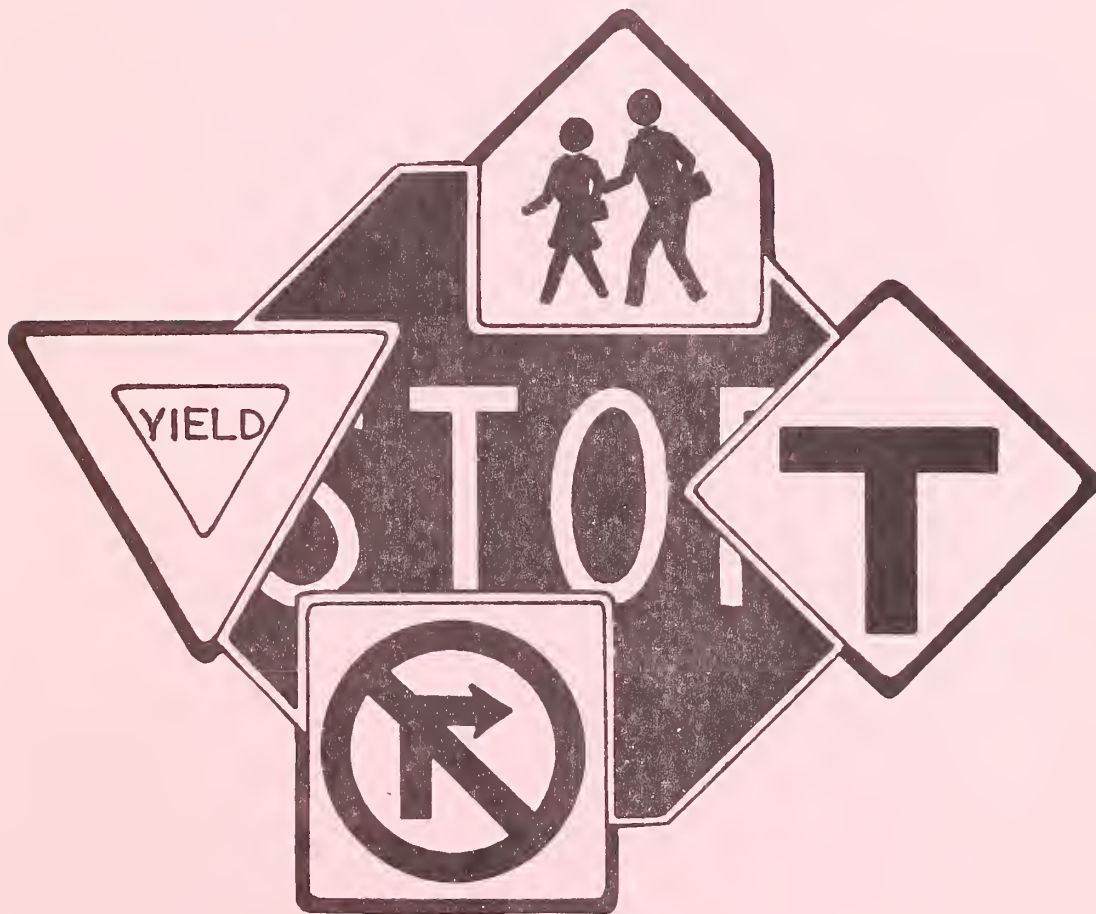
Highway traffic signals are of two basic types; pretimed signals and traffic - actuated signals.

Pretimed signals are set to operate on a regular and consistent cycle. This type of control is best suited to intersections where traffic patterns are relatively stable.

The traffic - actuated controller differs basically from the pretimed controller in that signal indications are not of fixed length but are determined by traffic flow as measured by vehicle detectors.

CHAPTER 2

INVENTORIES



CHAPTER II

INVENTORIES

Three inventory surveys were conducted to gather information on traffic signs, automatic signals and accidents.

TRAFFIC SIGNS

The data collected for each traffic sign in the City of Anaconda was as follows:

1. location
2. sign code number (see Appendix A)
3. size of sign in inches - horizontal and vertical
4. type of face - facing material
5. type of backing - steel, plywood, aluminum, etc.
6. condition - physical condition; for example - rusty, bent or damaged.
7. visibility - obstructions such as trees, poles or other signs.
8. number of signs in assembly - more than one sign on same support.
9. number of posts - number of sign supports.
10. type of post - steel, wood, aluminum, etc.
11. condition and placement of post - bent post, distance from curb.

12. sign color
13. legend color
14. lateral clearance
15. mounting height - height of sign from ground.
16. letter size
17. letter type

In addition to the above information, sketches were made showing location dimensions and in cases of poor visibility, photographs were taken. (see Appendix)

The following table summarizes the results of the traffic sign inventory:

TABLE 1

<u>Type of sign</u>	<u>Number in city limits</u>
Stop	190
Yield	4
Speed Limit	4
One Way	16
No Parking	9
Do Not Enter	5
Road Closed	1
No Passing	1
Watch For Children	<u>12</u>
TOTAL	242

TRAFFIC SIGNALS

An inventory was made of each automatic traffic signal within the City limits. The following information was collected:

1. location - general location of the installation.
2. location of signal heads - a sketch was made showing the location of the signal heads within the intersection.
3. signal phasing - the number of phases displayed by the signal were determined.
4. type of controller - the brand and type (fixed time, actuated) of each controller was determined.
5. vehicular timing - each phase of the signal was timed to determine red, green and yellow time for each leg of the intersection.
6. pedestrian timing - the time allowed for pedestrians was measured.
7. sketch - a field sketch of each intersection was made showing location of poles, span wires, trees and other intersection characteristics.

There are 12* traffic signals within the Anaconda city limits. 8 of these are 3 phase, pretimed signals. The 4 remaining signals are flashing beacons used to control traffic during fire runs.

Chapter III discusses sign and signal deficiencies in detail.

* The signal at Park and Main is temporarily down due to recent fire.

ACCIDENTS

The accident survey consisted of a tabulation of City accident records for the years 1969, 1970 and 1971. Each accident was plotted on a city map. Non-injury, injury and fatality accidents were differentiated. Based upon the accident location map, the five highest rate locations were selected. The records for these locations were examined in detail and an accident collision diagram was prepared.

The City of Anaconda accident records revealed that there were 916 accidents in the three year period from 1969 through 1971. The following table summarizes accident data.

TABLE 2

<u>TYPE OF ACCIDENT</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
property damage only	243	279	292
injury	38	32	31
fatality	<u>---</u>	<u>---</u>	<u>1</u>
TOTAL	281	311	324

Based on the city-wide accident data, 5 intersections were selected for detailed analysis. Table 3 summarizes accident data for the years 1969 - 1971 at the five locations.

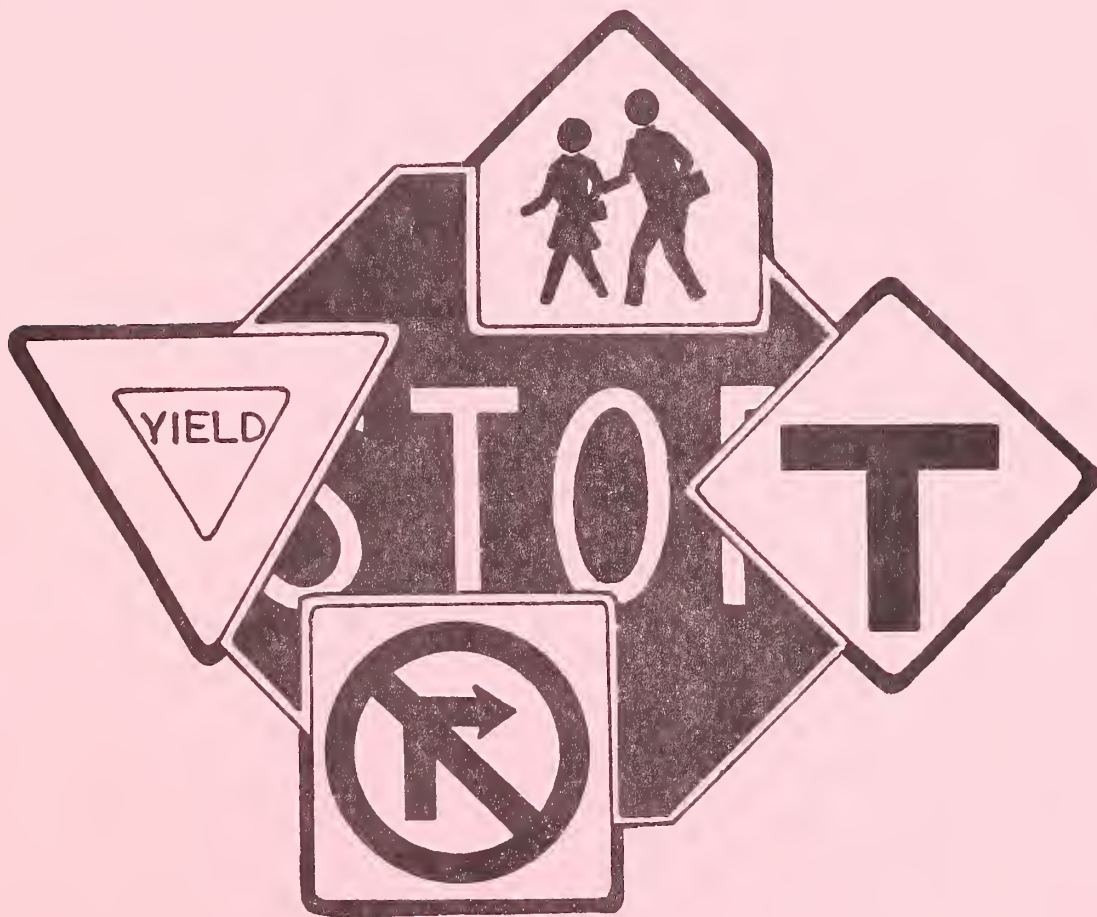
TABLE 3

<u>LOCATION</u>	<u>NON INJURY</u>	<u>INJURY</u>	<u>FATALITY</u>	<u>TOTAL</u>
Park & Main	23	2	1	26
Park & Cherry	17	2	--	19
Park & Birch	14	1	--	15
Park & Cedar	9	2	--	11
Park & Oak	<u>6</u>	<u>3</u>	<u>--</u>	<u>9</u>
TOTAL	69	10	1	80

Collision diagrams for these locations are analyzed in detail in Chapter III.

CHAPTER 3

ANALYSIS



CHAPTER III

ANALYSIS

The Manual on Uniform Traffic Control Devices for Streets and Highways sets forth standards for traffic signs and signals. These standards were used as a basis for determining traffic control device deficiencies in the City of Anaconda. It is the goal of the Federal Highway Administration to reach nationwide conformance of pavement marking standards by 1973, traffic signs by 1975 and signals by 1977.

TRAFFIC SIGNS

Table 4 lists the sign type, location, deficiency and recommendation for upgrading each deficient traffic sign in the City.

TABLE 4

Type of Sign	Location	Leg- North, East South, West	Deficiency	Recommended Corrections
STOP	Monroe & Commercial	South	location	relocate
STOP	Madison & Park	North	visibility	relocate
STOP	Jackson & Park	North	condition	replace
STOP	Jackson & Fourth	South	size & color	replace
STOP	Monroe & Fourth	South	size & color	replace

TABLE 4 (Continued)

Type of Sign	Location	Leg- North, East South, West	Deficiency	Recommended Corrections
STOP	Madison & Fourth	South	size, color condition	replace
STOP	Adams & Park	North	visibility	relocate
STOP	Adams & Park	North	size, color location	replace
STOP	Adams & Third	South	visibility	relocate
STOP	Adams & Fourth	North	visibility, size, color	replace & relocate
STOP	Ash & Third	North	condition	replace
STOP	Ash & Fourth	North	visibility	relocate
STOP	Birch & Sixth	West	color & size	replace
STOP	Birch & Sixth	East	size & color	replace
STOP	Birch & Fourth	North	condition	replace
STOP	Chestnut & Fourth	South	color & condition	replace
STOP	Cedar & Eighth	West	color	replace
STOP	Cedar & Fourth	North	size, color condition	replace
STOP	Cedar & Fourth	South	size, color condition	replace

TABLE 4 (Continued)

Type of Sign	Location	Leg- North, East South, West	Deficiency	Recommended Corrections
STOP	Spruce & Third	North	visibility	relocate
STOP	Main & Fourth	South	not needed	remove
STOP	Main & Fourth	West	not needed	remove
STOP	Hickory & Fourth	North	visibility, size, color	replace & relocate
STOP	Hickory & Fourth	South	size & color	replace
STOP	Locust & Fourth	North	color condition	replace
STOP	Locust & Fourth	South	color condition	replace
STOP	Elm & Fourth	North	visibility	relocate
STOP	Pine & Fourth	North	size, color condition	replace
STOP	Walnut & Fourth	North	color	replace
STOP	Walnut & Fourth	South	color	replace
STOP	Elm & Commercial	South	visibility	relocate
STOP	Beech & Park	South	size & color	replace
STOP	Sycamore & Fourth	North	condition	replace

TABLE 4 (Continued)

Type of Sign	Location	Leg- North, East South, West	Deficiency	Recommended Corrections
STOP	Penn. Ave. & Cedar	West	size, color condition	replace
YIELD	Van Buren & Park	South	size & color	replace
YIELD	Van Buren & Third	West	size & color	replace
YIELD	Harrison & Fourth	North	size & color	replace
YIELD	Cottonwood & Park	West	size & color	replace
DO NOT ENTER	Jefferson & Third	North	size, color design	replace
DO NOT ENTER	Jefferson	North	size, color design	replace
DO NOT ENTER	Commercial & Spruce	West	size, color design	replace
DO NOT ENTER	Spruce & Park	Island	size, color design	replace
DO NOT ENTER	Eighth & Alder	North	size, color design	replace
ROAD CLOSED	Van Buren & Third	East	size & color	replace
WATCH FOR CHILDREN	Monroe & Sixth	North	size & design	replace
WATCH FOR CHILDREN	Walnut & Park	East	size & design	replace
WATCH FOR CHILDREN	Chestnut N. of Fifth	North	size & design	replace

TABLE 4 (Continued)

Type of Sign	Location	Leg- North, East South, West	Deficiency	Recommended Corrections
WATCH FOR CHILDREN	Chestnut N. of Fourth	North	size & design	replace
WATCH FOR CHILDREN	Oak & Eighth	North	size & design	replace
WATCH FOR CHILDREN	Willow & Fourth	West	size & design	replace
WATCH FOR CHILDREN	Sycamore & Fourth	East	size & design	replace
WATCH FOR CHILDREN	Juniper & Tammany	East	size & design	replace
PARALLEL PARKING	Oak & Third	West	color	replace
RIGHT TURN ON RED	Cherry & Park	West	location	replace & relocate
RIGHT TURN ON RED	Alder & Fourth	West	location	replace & relocate
SCHOOL	Fourth, E. of Birch	East	size & color	replace
SCHOOL	Sixth, E. of Chestnut	East	size & design	replace
SCHOOL	Chestnut, N. of Fifth	North	size, color design	replace
SCHOOL	Third, E. of Cherry	East	size & design	replace
SCHOOL	Cherry, N of Fourth	North	size & design	replace
SCHOOL	Oak & Third	South	size & design	replace

TABLE 4 (Continued)

Type of Sign	Location	Leg- North, East South, West	Deficiency	Recommended Corrections
SCHOOL	Fifth, E of Oak	East	size & design	replace
SCHOOL	Willow & Fourth	East	size & design	replace
SCHOOL	Main, N of Seventh	North	size & design	replace
SCHOOL	Fourth, E. of Locust	East	size & design	replace
SCHOOL	Fourth, E. of Locust	East	size & design	replace
SCHOOL	Maple, N. of Sixth	North	size & design	replace
SCHOOL	Fifth, E. of Maple	East	size & design	replace
SCHOOL	Maple & Third	West	size & design	replace
SCHOOL	Sixth, E. of Elm	East	size & design	replace
SCHOOL	Juniper & Tammany		size, color design	replace
SCHOOL	Fir & Park		size, color design	replace
SCHOOL SPEED ZONE	Ash & Fourth	East	size	replace
SCHOOL SPEED ZONE	5th, E. of Chestnut	East	size	replace
SCHOOL SPEED ZONE	Sixth, E. of Cedar	East	size	replace

TABLE 4 (Continued)

Type of Sign	Location	Leg- North, East South, West	Deficiency	Recommended Corrections
SCHOOL SPEED ZONE	Chestnut, N. of 7th	North	size	replace
SCHOOL SPEED ZONE	Fifth, E. of Main	East	size	replace
SCHOOL SPEED ZONE	Main & Sixth	South	size	replace
SCHOOL SPEED ZONE	Main & Fifth	North	size	replace
SCHOOL SPEED ZONE	Fifth, E. of Hickory	East	size	replace
SCHOOL SPEED ZONE	Sixth, E. of Hickory	East	size	replace
SCHOOL SPEED ZONE	Fifth, E. of Maple	East	size	replace
SCHOOL SPEED ZONE	Maple, N. of Sixth	North	size	replace
SCHOOL SPEED ZONE	Maple, N. of Fourth	North	size	replace
SCHOOL SPEED ZONE	Fifth, E. of Elm	East	size, visibility	replace & relocate
SCHOOL SPEED ZONE	Fourth, E. of Elm	East	size	replace
SCHOOL SPEED ZONE	Willow & Fourth	West	size	replace
SCHOOL SPEED ZONE	Park, E of Sycamore	East	size	replace
HOSPITAL	Commercial & Oak	East	size & design	replace

TABLE 4 (Continued)

Type of Sign	Location	Leg- North, East South, West	Deficiency	Recommended Corrections
EVAC. ROUTE	Fourth & Hickory	North	size, cond. visibility	replace & relocate
EVAC. ROUTE	Fourth & Hickory	South	size, cond. visibility	replace & relocate
EVAC. ROUTE	Fourth & Locust	North	size & condition	replace
EVAC. ROUTE	Fourth & Locust	South	size & condition	replace
EVAC. ROUTE	Fourth & Jefferson	North	size & condition	replace
EVAC. ROUTE	Fourth & Jefferson	South	size & condition	replace
EVAC. ROUTE	Fourth & Cherry	North	size & condition	replace
EVAC. ROUTE	Fourth & Cherry	South	size & condition	replace
HW. RT. MARKER	Park, E. of Hickory	East	size & condition	replace
NO PARKING	Cedar & Park	East	size	replace
RIGHT TURN ON RED	Cherry & Park	West	size	replace
RIGHT TURN ON RED	Alder & Fourth	North	size	replace
RIGHT TURN ON RED	Fourth & Main	South	size	replace
RIGHT TURN ON RED	Fourth & Main	East	size	replace

TABLE 4 (Continued)

Type of Sign	Location	Leg- North, East South, West	Deficiency	Recommended Corrections
RIGHT TURN ON RED	Larch & Park	East	size	replace
RIGHT TURN ON RED	Larch & Park	West	size	replace
HW. RT. MARKER	Park, W. of Spruce	West	size & design	replace
SCHOOL	Park, E. of Beech	East	size & design	replace

Of the 190 STOP signs, 34 were found to be substandard. Eight STOP signs can be upgraded by relocating the existing sign to improve visibility. Of the remaining 27 STOP signs, 3 should be removed because they are located at signal controlled intersections and are unnecessary. An additional 3 standard STOP signs should be removed from signalized intersections. The remaining 24 signs require replacement.

All 4 YIELD signs in the City are substandard in color and size. These signs will require replacement.

All 5 of the DO NOT ENTER signs are substandard in color, size and design and should be replaced.

The ROAD CLOSED sign located at Van Buren and Third is substandard

in color and size.

A total of 59 miscellaneous signs including WATCH FOR CHILDREN, PARALLEL PARKING, RIGHT TURN ON RED, SCHOOL, SCHOOL SPEED ZONE, HOSPITAL, EVACUATION ROUTE, HIGHWAY ROUTE MARKERS and NO PARKING should be replaced to conform to the Uniform Manual standards.

A total of 8 signs can be upgraded by relocation. 93 signs need to be replaced and 6 signs removed to bring the existing traffic signing system up to standard.

TRAFFIC SIGNALS

Table 5 shows the location of traffic signals and the deficiencies at each location.

TABLE 5
COMPARISON OF EXISTING SIGNAL INSTALLATIONS WITH NATIONAL STANDARDS
MANUAL ON UNIFORM TRAFFIC CONTROL

Inter- section Location	type of mounting	Meets Uniform Standards	Number of Signal Faces			Remarks
		Yes/No	Exist./	Req'd/	Deficient	
E. Park & Main	D.W.	No	3V	6V	3V	Out due to fire
E. Park & Cherry	D.W.	No	3V	6V	3V	
E. Park & Birch	D.W.	No	3V	6V	3V	
E. Park & Cedar	D.W.	No	3V	6V	3V	Fire lane Blinker
W. Park & Larch	D.W.	No	3V	6V	3V	
4th & Main	D.W.	No	4V	8V	4V	
4th & Alder	D.W.	No	4V	8V	4V	
4th & Chestnut	D.W.	No	4V	8V	4V	
4th & Washington	D.W.	No	4V	8V	4V	
4th & Cedar	D.W.	No	4V	8V	4V	

TABLE 5 (Continued)

Inter- section Location	type of mounting	Meets Uniform Standards	Number of Signal Faces			Remarks
		Yes/No	Exist./	Req'd/	Deficient	
3rd & Cedar	D.W.	No	4V	8V	4V	
Commercial & Main	D.W.	No	3V	6V	3V	
Commercial & Cedar	D.W.	No	3V	6V	3V	
TOTALS		<u>13</u>	<u>45</u>	<u>90</u>	<u>45</u>	

NOTE: 3V - 3 vehicular signal heads
D.W. - Diagonal span wire

ACCIDENTS

The location with the highest incidence of accidents in the City is the intersection of Park Avenue and Main Street. Thirty accidents occurred at this location during the three year period, 1969 - 1971. Four of the accidents could not be plotted on the collision diagram due to incomplete accident reports. (See collision diagram 1)

The only fatality in the City during the three year period, occurred at this location on the afternoon of March 19, 1971, when a pedestrian was hit by a vehicle making a left turn from the north leg of Main Street onto Park Avenue. This was the only pedestrian accident occurring at this location during the three year period.

There were two injury accidents at this location - both resulted from rear-end collisions in 1969 and 1970.

The most common type of accident at this location involved parked or parking vehicles. Five occurred in 1969, five in 1970 and three in 1971. This type of accident accounted for one-half of all accidents over the three year period.

The second most common accident was the rear-end collision with two in 1969, three in 1970 and four in 1971. Most of these accidents occurred on the west leg of the intersection. Five of the nine rear-end collisions occurred during wet or icy conditions.

ACCIDENT TOTALS BY TYPE

TYPE	DAY	NIGHT	TOTAL
FATAL	1		1
PED. INJURY			
OTHER INJURY	2		2
PROP. DAMAGE ONLY	15	8	23
TOTAL	18	8	26

LEGEND

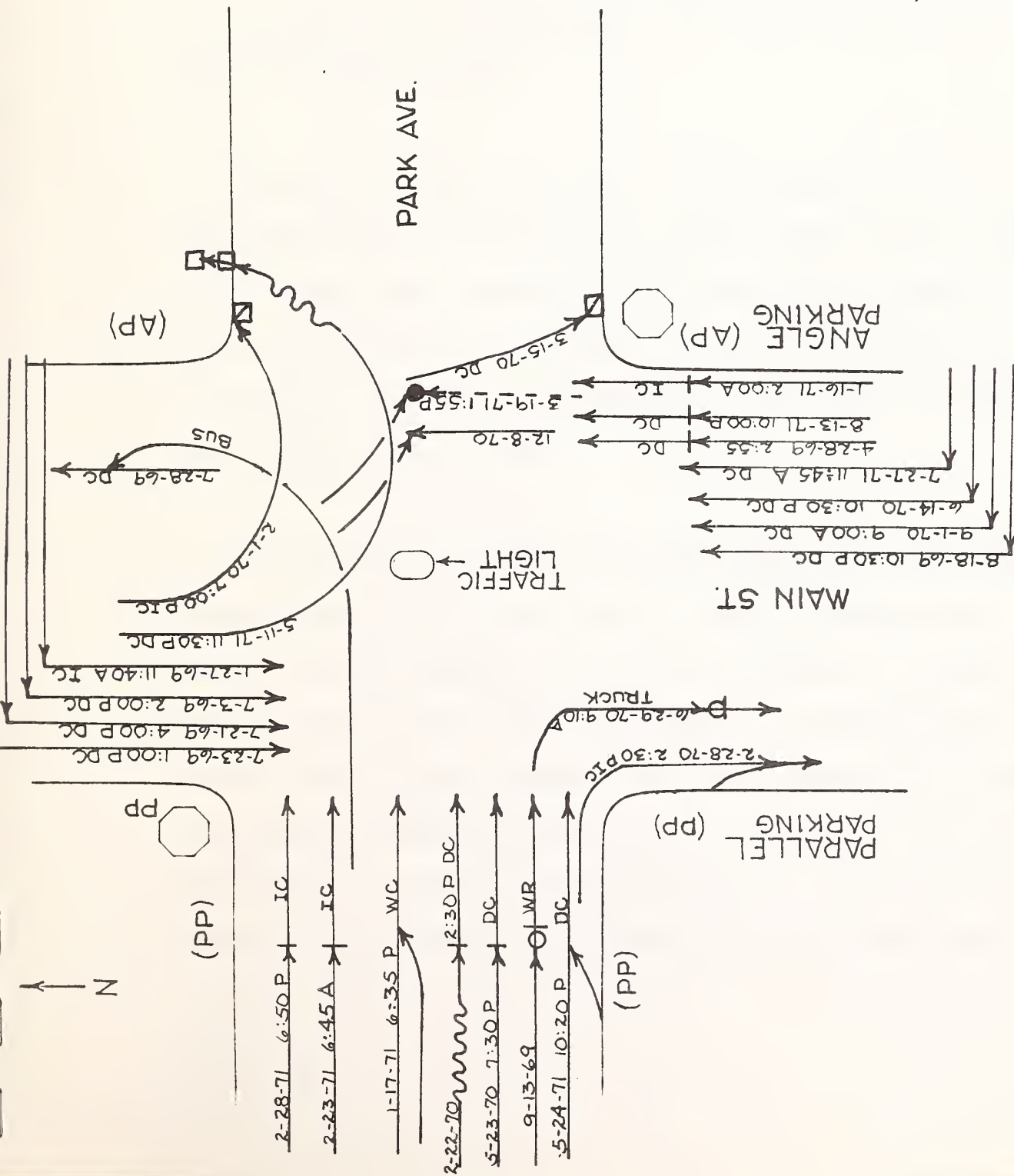
PATH OF MOVING VEHICLE
 PEDESTRIAN PATH
 FATAL
 NON-FATAL
 REAR-END COLLISION
 PARKED VEHICLE
 FIXED OBJECT
 OVERTURNED
 OUT OF CONTROL
 SIDESWIPE

TIME: A = AM P = PM

PAVEMENT: D = DRY I = ICY W = WET

WEATHER: C = CLEAR F = FOG R = RAIN

SL = SLEET S = SNOW



LOCATION: PARK & MAIN
 DATE COMPILED: APRIL 1972
 PERIOD COVERED: 1969 TO 1971

COLLISION DIAGRAM

Other miscellaneous accidents were - one sideswipe on the west leg and one angle collision between a northbound vehicle and a vehicle turning left onto Park Avenue from Main Street.

Twenty accidents occurred at the intersection of Park Avenue and Birch Street during the three year period. (See collision diagram 2) Eight were rear-end collisions and eight involved vehicles pulling out of on-street, angle parking spaces. There were two accidents involving injuries at this location.

Nineteen accidents occurred at the intersection of Park Avenue and Cherry Street during the three year period. (See collision diagram 3) Nine accidents were rear-end collisions and eight involved vehicles pulling out of on-street parking spaces. All but two of the accidents occurred on the south and west approaches. There were two injury accidents, both were rear-end collisions.

The intersection of Park Avenue and Cedar Street experienced sixteen accidents over the three year period. (See collision diagram 4) There were two injury accidents, one involving a bicycle. The types of collisions at this location differ from those at the three former locations. Eleven of the accidents involved collisions between turning vehicles. There was one rear-end collision, the low incidence of this type can be attributed to the fact that this intersection is not signalized whereas the other three locations are. During icy or wet conditions, signalized

The map shows the intersection of Park Ave. and Drive Way. A north arrow points towards the top left. The intersection is marked with a circle labeled (ΔP). The street layout includes a driveway on the left, a main road (Park Ave.) running horizontally, and a side road (Drive Way) running vertically. Traffic light schedules are indicated by arrows and text:

- Top Left (Drive Way):** 6-18-70 DC, 7-12-71 11:00A DC, 9-8-71 3:00P DC.
- Top Right (Park Ave.):** 6-21-70 11:10A DC.
- Bottom Left (Drive Way):** 10-12-70 3:30P DC, 12-8-71 6:10P IS, 2-4-71 6:35P IC.
- Bottom Center (Intersection):** 3-1-69 2:30A DC, 2-18-69 3:00P.
- Bottom Right (Park Ave.):** 5-11-69 11:10A DC, 6-28-69 8:15P DC, MOTOR CYCLE.
- Far Right (Park Ave.):** 1-11-69 4:15 IC.

TYPE	DAY	NIGHT	TOTAL
FATAL			
PED. INJURY			
OTHER INJURY		1	1
PROP. DAMAGE ONLY	17	1	18
TOTAL	17	2	19

LEGEND

PATH OF MOVING VEHICLE _____ →
 PEDESTRIAN PATH _____ →
 FATAL ☒ _____
 NON-FATAL ☐ _____
 REAR-END COLLISION _____ →
 PARKED VEHICLE ☒ _____
 FIXED OBJECT ☐ _____
 OVERTURNED *el* _____
 OUT OF CONTROL _____ ~~~~~
 SIDESWIPE _____ →

TIME: $\Delta = \Delta M$ $P = PM$

PAVEMENT: D = DRY I = ICY W = WET

WEATHER: C = CLEAR F = FOG R = RAIN

SL = SLEET S = SNOW

LOCATION: PARK É BIRCH

DATE COMPILED: APRIL 1972

PERIOD COVERED: 1969 TO 1971

COLLISION DIAGRAM

COLLISION DIAGRAM

ACCIDENT TOTALS BY TYPE				
TYPE	DAY	NIGHT	TOTAL	
FATAL				
PED. INJURY				
OTHER INJURY		2	2	
PROP. DAMAGE ONLY	14	3	17	
TOTAL	14	5	19	

LEGEND

PATH OF MOVING VEHICLE _____ →

PEDESTRIAN PATH _____ →

FATAL ☒ _____

NON-FATAL ☐ _____

REAR-END COLLISION _____ →

PARKED VEHICLE ☒ _____

FIXED OBJECT ☐ _____

OVERTURNED ☒ _____

OUT OF CONTROL _____ →

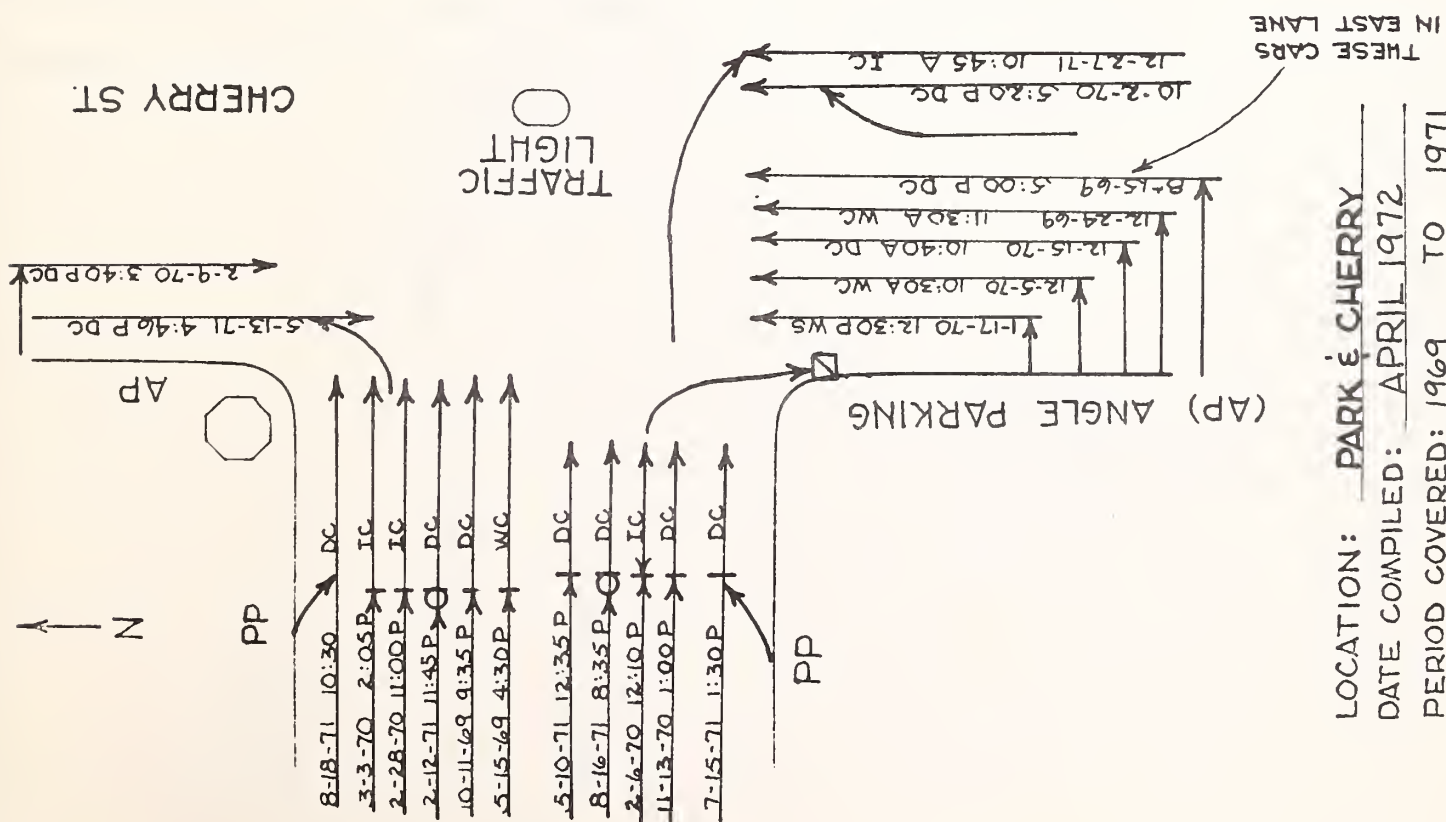
SIDESWIPE _____ →

TIME: $\Delta = \Delta M$ $P = PM$

PAVEMENT: D = DRY I = ICY W = WET

WEATHER: C = CLEAR F = FOG R = RAIN

SL = SLEET S = SNOW



ACCIDENT TOTALS BY TYPE

TYPE	DAY	NIGHT	TOTAL
FATAL			
PED. INJURY			
OTHER INJURY	2	1	3
PROP. DAMAGE ONLY	7		7
TOTAL	9	1	10

LEGEND

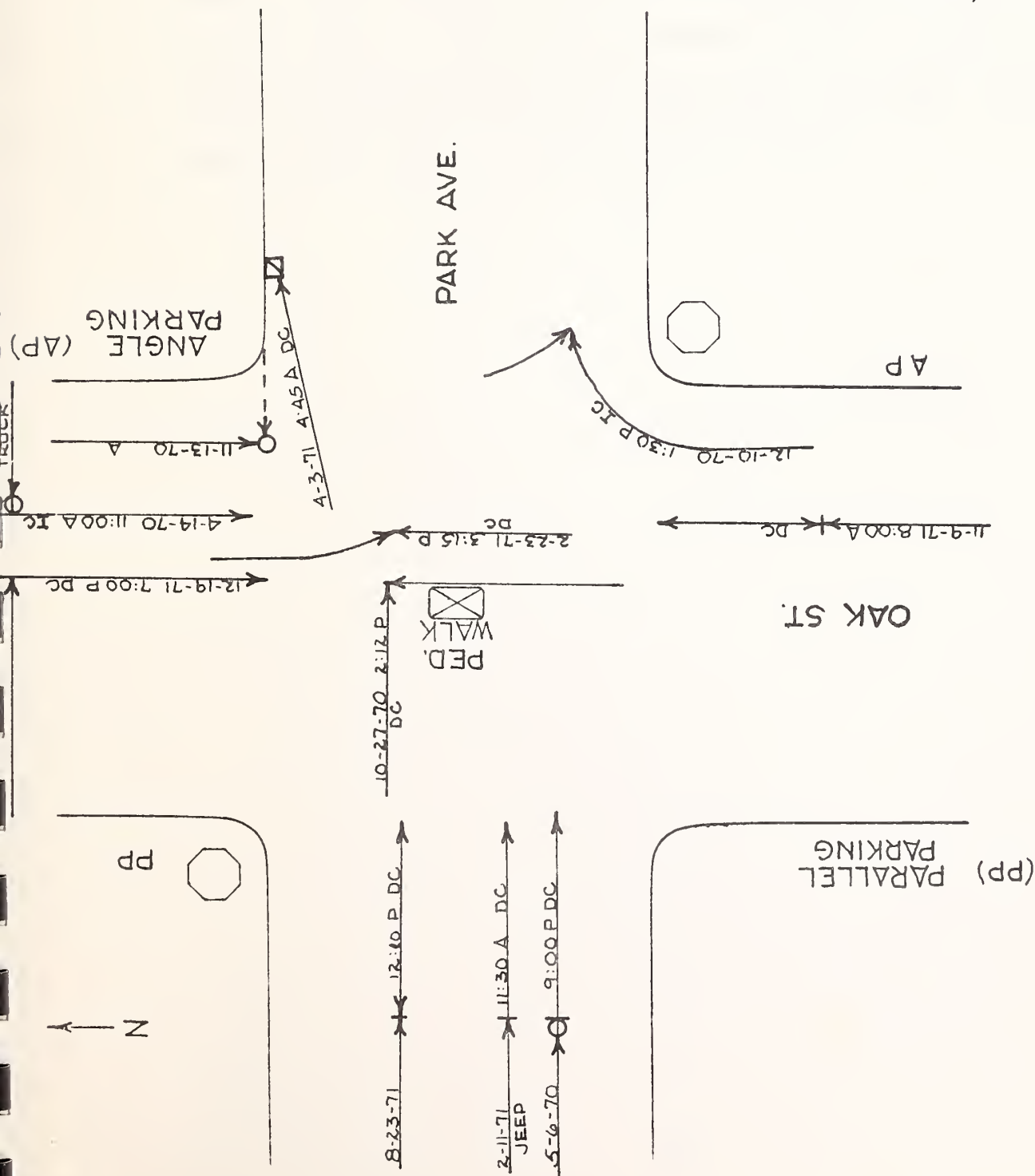
PATH OF MOVING VEHICLE _____
 PEDESTRIAN PATH _____
 FATAL ○
 NON-FATAL ○
 REAR-END COLLISION _____
 PARKED VEHICLE □
 FIXED OBJECT □
 OVERTURNED 
 OUT OF CONTROL _____
 SIDESWIPE _____

TIME: A = AM P = PM

PAVEMENT: D = DRY I = ICY

WEATHER: C = CLEAR F = FOG R = RAIN

SL = SLEET S = SNOW



LOCATION: PARK & OAK
 DATE COMPILED: APRIL 1972
 PERIOD COVERED: 1969 TO 1971

COLLISION DIAGRAM

intersections experience a higher number of rear-end collisions compared to a STOP sign controlled intersection. This is due to the tendency to maintain a higher speed to try to clear the green indication, without stopping, while at a STOP intersection, a stop is always required.

Ten accidents occurred at the intersection of Park Avenue and Oak Street. (See collision diagram 5) Four involved rear-end collisions with one injury. There was one accident involving a pedestrian, two involving unparking vehicles and three angle collisions. There were a total of three injury accidents at this location.

ACCIDENT TOTALS BY TYPE

TYPE	DAY	NIGHT	TOTAL
FATAL			
PED. INJURY			
OTHER INJURY	1	1	2
PROP. DAMAGE ONLY	9	5	14
TOTAL	10	6	16

LEGEND

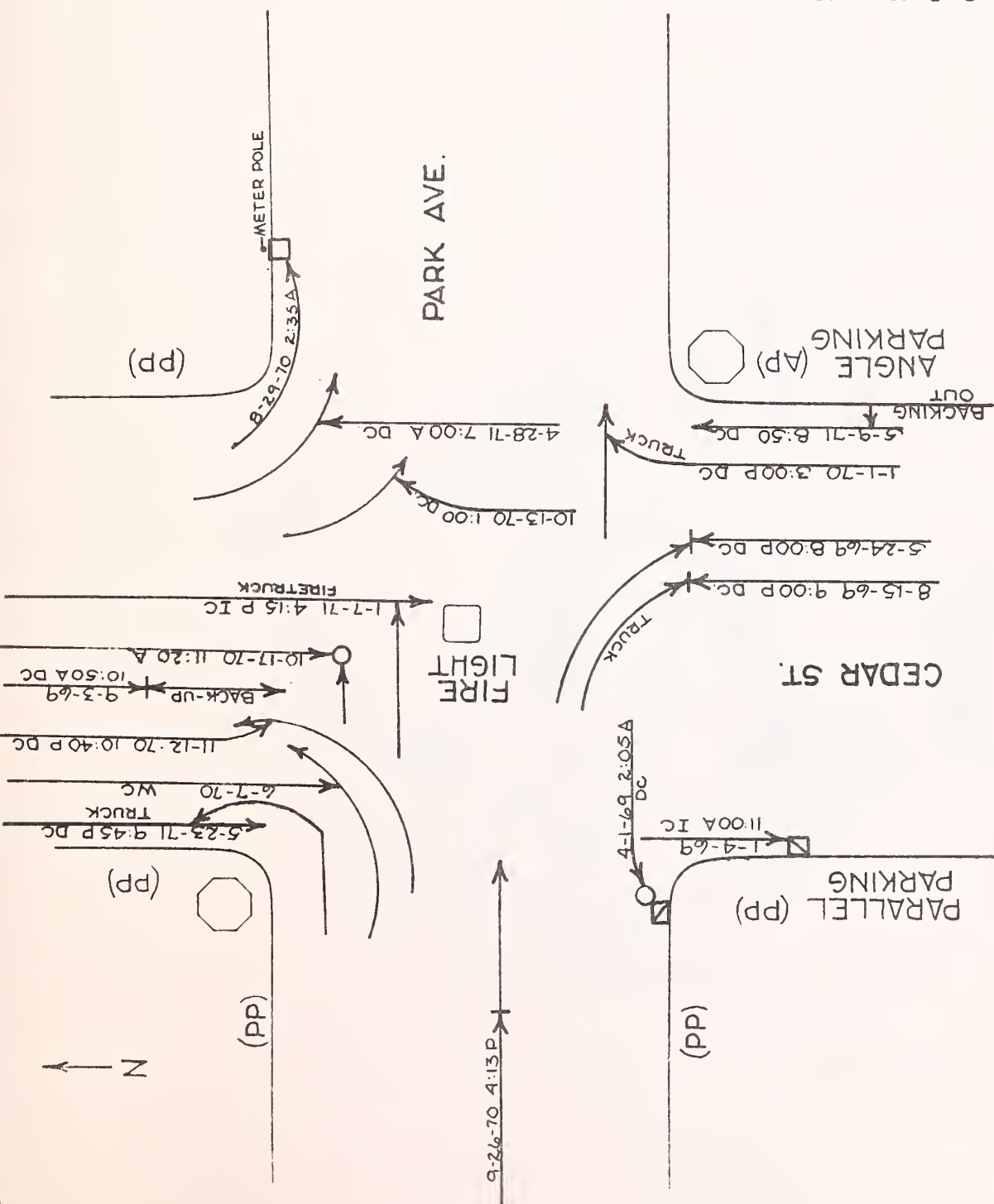
PATH OF MOVING VEHICLE _____
 PEDESTRIAN PATH _____
 FATAL ●
 NON-FATAL ○
 REAR-END COLLISION ⊕
 PARKED VEHICLE □
 FIXED OBJECT □
 OVERTURNED *el*
 OUT OF CONTROL ~~~~~
 SIDESWIPE ~~~~~

TIME: A = AM P = PM

PAVEMENT: D = DRY I = ICY W = WET

WEATHER: C = CLEAR F = FOG R = RAIN

SL = SLEET S = SNOW



LOCATION: PARK & CEDAR

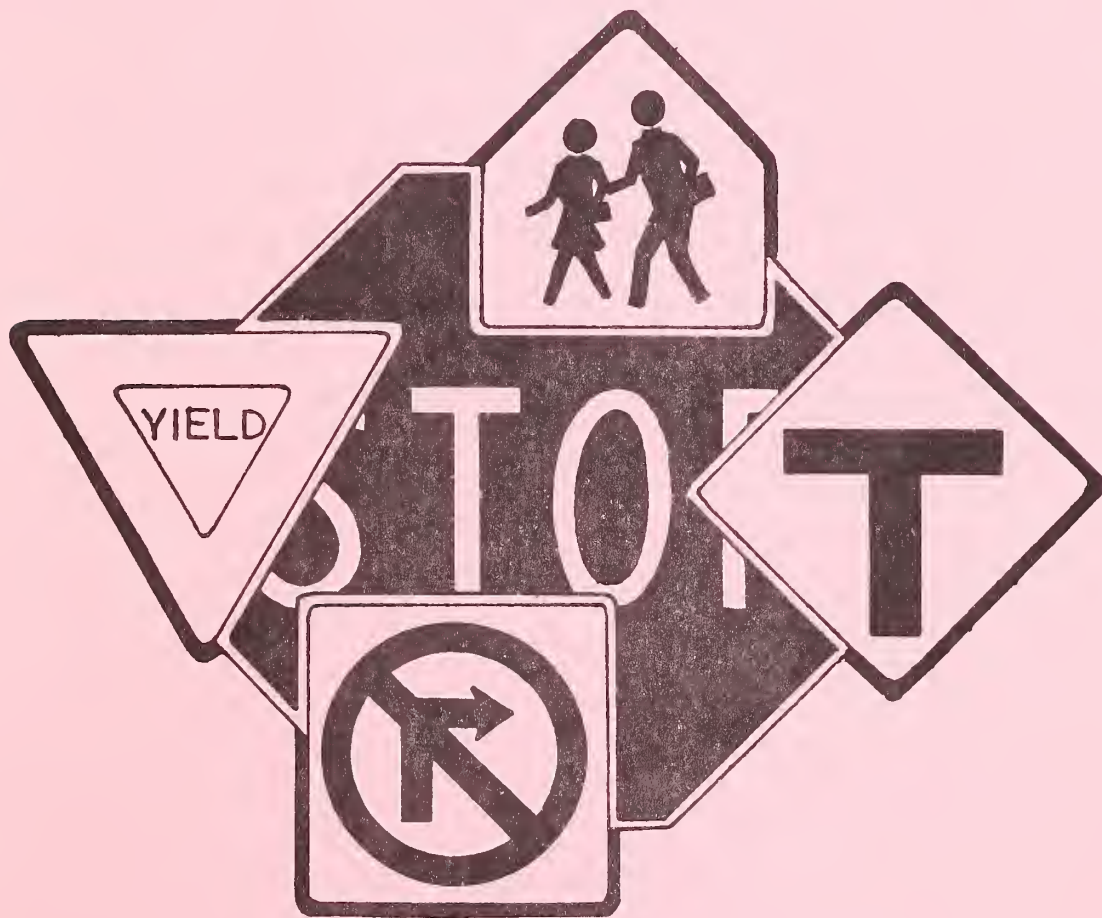
DATE COMPILED: APRIL 1972

PERIOD COVERED: 1969 TO 1971

COLLISION DIAGRAM

CHAPTER 4

RECOMMENDATIONS



CHAPTER IV

RECOMMENDATIONS

Based on the inventories and analysis, the following recommendations are set forth.

TRAFFIC SIGNS

The appearance of the City of Anaconda can be greatly enhanced by upgrading the traffic sign system. Traffic Signs are observed by every visitor to the City. Anaconda could be unique by being one of the first cities in the State to conform to the new Uniform Manual.

Recommendations (see Table 4 for location)

1. Relocate 8 signs to improve visibility. This project could be carried out by city crews.
2. Replace 93 substandard signs with signs specified by the Manual on Uniform Traffic Control Devices. Funds for this project may be available from the following sources:
 - Montana Highway Commission - TOPICS Program
 - Montana Highway Commission - 9999's Project
 - Office of Highway Safety
 - City's share of State Gas Tax
3. Remove STOP signs presently located at intersections controlled by traffic signals. These locations are:
 - Park and Cherry - North and South legs
 - Park and Larch - South leg

4th and Main - East leg

4th and Washington - East and West legs

4. Upgrade street name signs - although these signs were not specifically inventoried, it was observed during the survey that many of the street name signs are missing or illegible. A street name signing program should be initiated as a community project by a local organization such as the Chamber of Commerce.
5. The sign inventory should be kept current. When a sign is replaced or upgraded the improvement should be entered into the inventory records. Records should be kept to show the age of each sign. This will enable the City to carry out an ongoing sign replacement program as well as being able to evaluate the effective life of various signing products.

TRAFFIC SIGNALS

The existing traffic signals should be upgraded to meet the Uniform Manual Standards by 1977. All traffic signals in the city limits are deficient in the number of signal heads displayed. The Uniform Manual requires that a minimum of two heads be displayed to each approach. This is particularly important in Anaconda because of the large number of campers and trucks passing through. Many times, these large vehicles block line of sight of following vehicles to the signal head. When two heads are provided, this problem is usually alleviated.

Recommendations (see Table 5 for location)

1. Conduct vehicular and pedestrian traffic counts at the approaches of all signalized intersections to determine if signals meet Uniform Manual vehicular or pedestrian traffic volume warrants. (Some counts are now available from the State Highway Department) Remove signals that do not meet the Uniform Manual warrants.
2. Upgrade remaining signals by adding additional heads at all approaches. Park Avenue signals will be upgraded by the Montana State Highway Department as part of the Park Avenue reconstruction and overlay projects - F68(14) and F164(13).
3. Remove six STOP signs from the locations as recommended in the traffic sign section. Three of these signs are standard and can be used as replacements at substandard locations.
4. Install pedestrian WALK and DON'T WALK indications at the following locations:

East Park Avenue and Main Street

East Park Avenue and Cherry Street

East Park Avenue and Birch Street

West Park Avenue and Larch Street

Fourth Street and Main Street

Fourth Street and Chestnut Street

Fourth Street and Washington Street

Commercial Avenue and Main Street

Installation at some of these locations may not be required if the signal is removed under the warrant evaluation (recom-

mendation #1). Installations on Park Avenue and Commercial Avenue are warranted by the one-way operation which makes it difficult for pedestrians to observe the vehicular signal heads. Other locations warrant pedestrian indications because of the proximity of schools.

HIGH ACCIDENT LOCATIONS

Certain operational improvements are recommended to decrease accident rates at the five highest accident locations.

Recommendations

1. Park and Main
 - a. Change from angle to parallel parking on the north and south legs. This should not be done until the Elks parking area is expanded to provide adequate offstreet parking.
 - b. Improve signal visibility (see traffic signal recommendations).
 - c. Conversion of the existing angle parking on the east side of Main on the north and south legs will provide enough additional width to allow the designation of an exclusive right turn bay on the south leg and an exclusive left turn bay on the north leg.
2. Park and Birch
 - a. Convert angle parking on west side of south leg to parallel parking.

- b. Improve signal visibility (see traffic signal recommendations).
- 3. Park and Cherry
 - a. Convert angle parking on west side of south leg to parallel parking.
 - b. Improve signal visibility (see traffic signal recommendations).
 - c. Increase yellow indication interval on west leg.
 - d. Keep west leg well sanded during icy conditions.
- 4. Park and Cedar
 - a. Mark STOP lines on north and south legs.
 - b. Remove parking on north side of Park Avenue for a distance of 30 feet west of the northwest corner of Park and Cedar to increase sight distance.
- 5. Park and Oak
 - a. Remove parking on the north side of Park for a distance of 30 feet west of the intersection of Park and Oak to increase sight distance.

The foregoing recommendations are based on analysis of the accident collision diagrams. At all five locations, a high percentage of accidents involve parking or unparking vehicles. The recommendations for these locations involve the removal of onstreet parking. The loss of this parking must be weighed against the cost of accident damage and injuries. The primary function of the street system is the movement of traffic, parking is a secondary use and should be rated as such in priority. Parking is

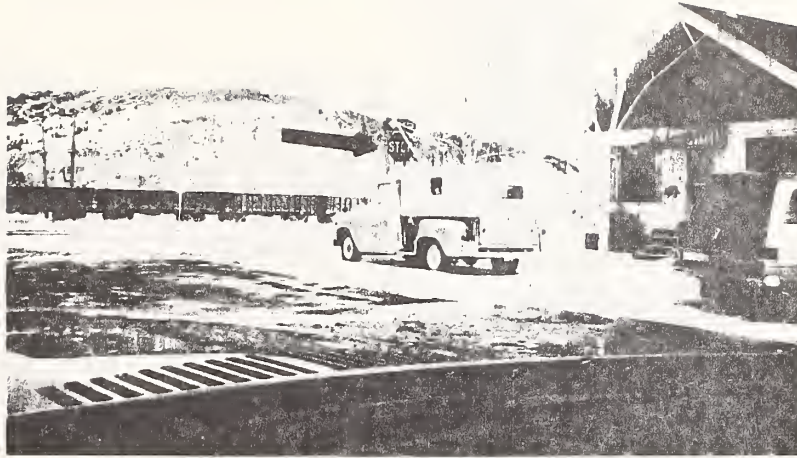
a primary land use in the central business district, without an adequate supply of convenient parking the economy of the entire community will suffer. The solution to the problem of parking and vehicular movement conflicts on the street system is the development of off-street parking.

The large number of rear-end collisions at signalized intersections may be decreased by two improvements; 1) Increase the YELLOW time allowing the driver a longer time to react to the signal indication change from GREEN to RED. If YELLOW time is increased to over 10 percent of the cycle time, it usually results in an increase in vehicles trying to beat the signal change; and 2) Increased winter maintenance to alleviate icy or snow packed conditions. This involves the application of sand or salt.

Collisions involving turning vehicles can sometimes be reduced by providing an exclusive turn lane or by removing parking to increase sight distance.

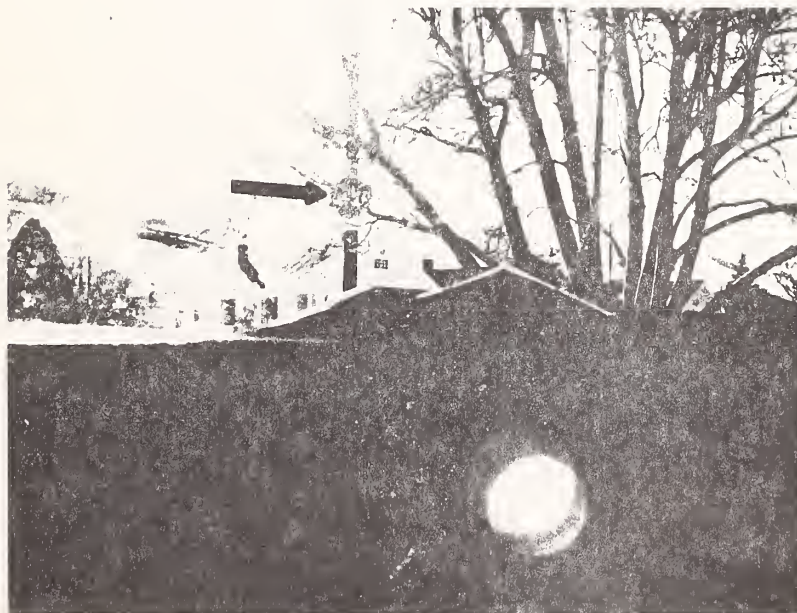
Many of the recommended improvements can be implemented with a minimum of effort and expense, others involve substantial investments. Improvements to the signal system should be carried out only after a further evaluation of traffic volumes at all locations.

APPENDIX



COMMERCIAL AND ELM

Sub-standard---visibility



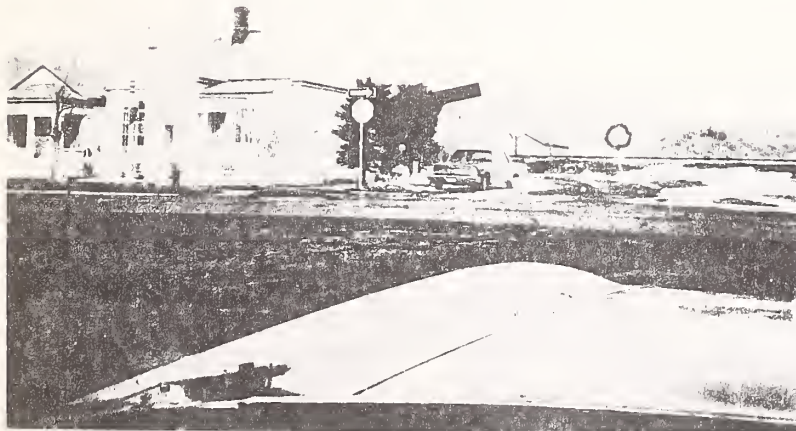
THIRD AND SPRUCE

Sub-standard---visibility



FOURTH AND ELM

Sub-standard---visibility



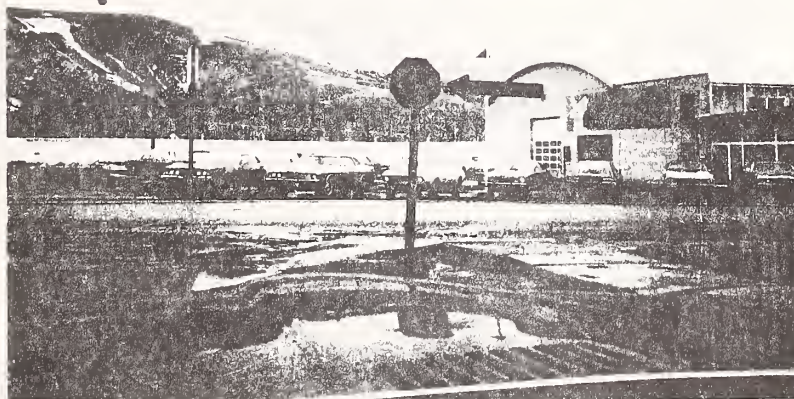
PARK AND ADAMS

Sub-standard---visibility



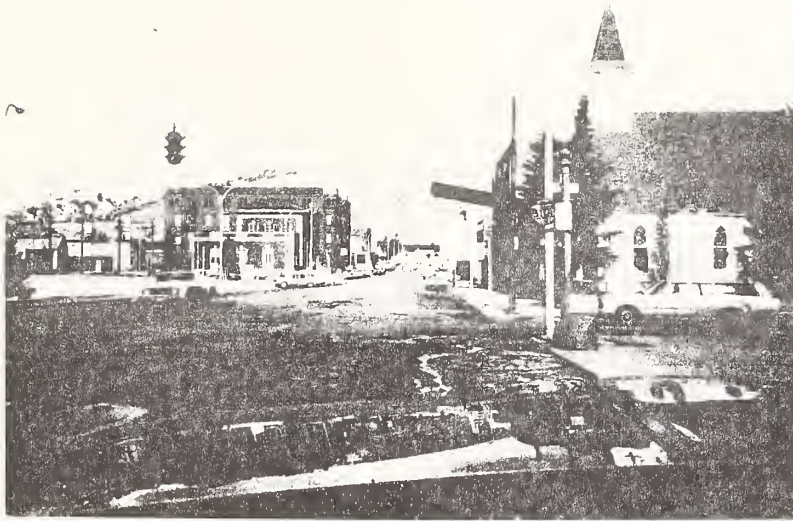
FOURTH AND CEDAR

Sub-standard---color, size, condition



PARK AND BEECH

Sub-standard---size, color



FOURTH AND MAIN

Sub-standard---not needed



FOURTH AND JEFFERSON

Sub-standard---size, condition



FOURTH AND JACKSON

Sub-standard---size, color



THIRD AND ADAMS

Sub-standard---visibility



FOURTH AND LOCUST

Sub-standard---condition, color



FOURTH AND MONROE

Sub-standard---size, color

